their attention to the urgent necessity for some reconsideration of the requirements of the universities from secondary schools. The Royal Society recognised, as of course it must recognise, the great importance of the humanities, but it felt that there was something wanting in the career which was insisted upon, especially at the older universities. This induced headmasters of secondary schools to select their most promising pupils entirely with a view to scholarships in classical literature, and to insist upon all the boys in a school spending a great deal of their time in studies for which, no doubt, many of them were fitted, but not all. The Royal Society had done a real service to the country by directing attention to this subject.

THE annual meeting of the court of governors of the University of Birmingham was held on January 28, when the Chancellor, Mr. Chamberlain, presided. During the course of a speech on the motion for the adoption of the annual report, Mr. Chamberlain referred to the question of Government aid for university education. He said, "I should be very sorry to see, in any application which may now or hereafter be made—either to public bodies or to the Government—any idea that that was to dispense individuals from their personal duty in the matter. I think undoubtedly that the Government might make a more liberal response to what individuals have in so many cases done, and nowhere more conspicuously than in Birmingham. When we are dealing with such modern universities as Manchester, Liverpool, and Birmingham, I think it is creditable to the inhabitants of the districts in which they are placed that they should have met so readily the calls upon them, and I think they are almost entitled to demand from the Government a corresponding contribution. But I should myself deprecate any attempt to throw the whole charge upon the Government, and thereby to lose all that we gain by the local patriotism which is evoked, the local self-denial, and the earnest interest which follows upon it. We shall ask the Government, in view of the very great development of this institution, for a larger grant, and we shall be supported by other institutions in the same position." We have on many occasions pointed out in these columns that generous treatment on the part of the State for university education, so far from diminishing private endowments and munificence, causes a marked increase of enthusiasm and generosity among the wealthy merchants and manufacturers. It is a mistaken policy, in a matter of such importance as the provision of facilities for higher education, to urge that Government assistance should only follow private efforts in the same direction, and if our statesmen adopt the working policy outlined by the Chancellor of the University of Birmingham, this country will have to wait a long time for a complete and satisfactory university system. Let the Government set the example and publicly recognise in a substantial manner its sense of the value of higher education, and private enterprise and endeavour will soon be aroused in a corresponding degree.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 21.—"On the Structure of the Palæozoic Seed, *Lagenostoma Lomaxi*, with a Statement of the Evidence upon which it is Referred to Lyginodendron." By Prof. F. W. **Oliver** and Dr. D. H. **Scott**, F.R.S. Received December 15, 1903.

The present communication deals with the structure of *Lagenostoma Lomaxi*, a fossil seed from the lower Coal-measures, and with the evidence upon which the authors refer it to the well-known Carboniferous plant, Lyginodendron.

It is found that this species of Lagenostoma, especially in its young form, was enclosed in a husk or cupule, borne on a short pedicel.

The seed, which is of cycladean character, is fully described, and its relation to other fossil and recent seeds discussed.

The cupule enclosing the seed was borne terminally on a pedicel; it formed a continuous, ribbed cup below, and divided above into a number of lobes or segments. Externally, both pedicel and cupule were studded with numerous prominent multicellular glands of capitate form. The anatomy indicates that the whole organ was of a foliar nature.

A comparison with the vegetative organs of *Lyginodendron Oldhamium*, with which the seeds are intimately associated, demonstrates a complete agreement in the structure of the glands and in the anatomy of the vascular system. Where vegetative and reproductive organs, presenting identical structural features, not known to occur in other plants, are thus found in close and constant association, the inference that the one belonged to the other appears irresistible.

As regards the position of the seed on the plant, two possibilities are discussed; the cupule, with its pedicel, may either represent an entire sporophyll or a modified pinnule of a compound leaf. Either view is tenable, but various comparative considerations lend a somewhat greater probability to the second alternative.

In the concluding section of the paper, the systematic position of Lyginodendron is discussed. On the whole of the evidence, the position of the genus as a member of a group of plants transitional between filicales and gymnosperms appears to be definitely established. While many filicinean characters are retained, the plant, in the organisation of its seed, had fully attained the level of a Palæozoic gymnosperm. There are many indications that other genera, now grouped under cycadofilices, had likewise become seed-bearing plants. It is proposed to found a distinct class, under the name Pteridospermæ, to embrace those Palæozoic plants with the habit, and much of the internal organisation of ferns, which were reproduced by means of seeds. At present the families Lyginodendreæ and Medulloseæ may be placed, with little risk of error, in the new class Pteridospermæ.

January 28.—"The Morphology of the Retrocalcarine Region of the Cortex Cerebri." By G. Elliot **Smith**, M.A., M.D., Fellow of St. John's College, Cambridge, Professor of Anatomy, Egyptian Government School of Medicine, Cairo. Communicated by Prof. A. Macalister, F.R.S.

Chemical Society, January 20.—Dr. W. A. Tilden, F.R.S., president, in the chair.—It was announced that the Rev. T. J. Prout had presented to the society a photograph of a portrait by Hayes of Dr. William Prout, F.R.S., the originator of Prout's hypothesis.—The following papers were read:—The chemical reactions of nickel carbonyl, parts i. and ii.: J. **Dewar** and H. O. **Jones.** It is shown that nickel carbonyl is completely decomposed by the halogens, cyanogen and sulphur, carbon monoxide, and the corresponding nickel compounds being produced. With aromatic hydrocarbons of the benzene series, in presence of aluminium chloride, the carbonyl compound condenses to form aldehydes and anthracene derivatives; with naphthalene a complex hydrocarbon is produced.—Optically active asymmetric nitrogen compounds, *d*- and *l*-phenylbenzylmethylethylammonium salts: H. O. **Jones.**—A microscopic method of determining molecular weights: G. **Barger.** The author has improved his method of determining molecular weights by observing the relative changes in size of a series of alternate drops of two solutions enclosed in capillary tubes, so that the experimental error has been reduced to within 5–10 per cent.—Studies in the acridine series, part i.: J. J. **Fox** and J. T. **Hewitt.**—*ortho*-Nitrobenzoylacetic acid: E. R. **Needham** and W. H. **Perkin**, jun.—The *cis*- and *trans*-modifications of *aaγ*-trimethylglutaconic acid: W. H. **Perkin**, jun., and A. E. **Smith.**—The influence of substitution on the rate of oxidation of the side chain, part i., oxidation of the mono- and dichlorotoluenes: J. B. **Cohen** and J. **Miller.**—The interdependence of physical and chemical criteria in the analysis of butter fat: T. E. **Thorpe.** Investigation of the butter produced in the United Kingdom has shown that the chemical nature of this fat is dependent on climatic influences, the nature of the fodder, the breed of the cow, the period of lactation, and the idiosyncrasy of the individual cow. Tables of the chemical constants of the butters examined illustrating this are given.—A simple thermostat for use in connection with the refractometric examination of oils and fats: T. E. **Thorpe.**—The condensation of furfuraldehyde with sodium succinate: A. W.

Titherley and J. F. **Spencer.**—The action of heat on α-hydroxycarboxylic acids: H. R. **Le Sueur.** A description of the aldehyde produced by heating α-hydroxystearic acid.—The fusion of *iso*-pilocarpine with caustic potash: H. A. D. **Jowett.** It is shown that the acid produced in this reaction is *n*-butyric acid, and not the *iso* acid as was formerly supposed.—Organic derivatives of silicon: F. S. **Kipping.** A description of the products obtained by the interaction of magnesium alkyl haloids with silicon and alkyl silicon chlorides.—Derivatives of highly substituted anilines: F. D. **Chattaway** and J. M. **Wadmore.**

Physical Society, January 22.—Dr. R. T. Glazebrook, F.R.S., president, in the chair.—Notes on non-homocentric pencils, and the shadows produced by them. (1) An elementary treatment of the standard astigmatic pencil: W. **Bennett.** It is shown that several of the properties of the standard astigmatic pencil, and the variations in the form of its cross section, can be simply deduced from a consideration of the projections of its rays upon two planes, each of which is at right angles to one of the two focal lines. The projections of the rays are in each case concurrent. The shadow of a straight wire at right angles to the axis is also dealt with, and it is shown that the rays intercepted by the wire are one set of generators of a hyperbolic paraboloid. The section of this surface by any other plane is a hyperbola or a parabola. The rays are seen to be all parallel to a plane through the axis. If the object wire is not at right angles to the axis the shadow surface is a hyperboloid of one sheet. The section by any plane is, in general, a hyperbola, which is rectangular when the plane is at right angles to the axis and reduces to two straight lines when the plane passes through either of the focal lines. The asymptotes of the rectangular hyperbolas lie in two planes which pass respectively through the two focal lines. The author showed string models of the various pencils and shadow surfaces and of pencils produced by lenses or mirrors. The paper concludes with a simple method for obtaining, by the method of sagittæ, the positions of the approximate lines produced in a small pencil refracted obliquely through a lens.—Some new cases of interference and diffraction: Prof. R. W. **Wood.** In this paper Prof. Wood discusses certain types of the interference of light which have been known for many years, as well as some cases which he thinks are quite new. The colours of mixed plates and the phenomena of interference in transparent films deposited on metallic reflectors are the cases chiefly considered. The facts which have been brought out may be summed up as follows. The colours of mixed plates are due to diffraction, and should not be classed with interferences in their films. The explanation originally given by Young, and the treatment given by Verdet and others, are unsatisfactory, and do not indicate what becomes of the energy. In the cases of films deposited on perfectly reflecting surfaces, which, according to the elementary theory, should exhibit no interference colours, we may, under certain conditions, have colours far more brilliant and quite as saturated as any shown by the soap bubble. In other cases, where at first sight no interference appears to have taken place, we may, by employing polarised monochromatic light, obtain fringes of a very curious nature, which are the result of the interference between the elliptical vibration coming from the metal surface and the plane-polarised vibration reflected from the surface of the transparent film.—On the photographic action of radium rays: S. **Skinner.** It is well known that a photographic plate by exposure to radium rays is affected in such a way that the plate develops similarly to its development after exposure to light. The experiments described in the paper are an attempt to answer the question: Are the actions the same? So far as can be seen, the final results of the actions and developments are the same, and the experiments appear to indicate that only slight differences occur in the early stages.

Entomological Society, January 20.—The 70th annual meeting, Prof. E. B. Poulton, F.R.S., president, in the chair.—It was announced that the following had been elected officers for the session 1904–5:—President, Prof. Edward B. Poulton, F.R.S.; treasurer, Mr. Robert McLachlan, F.R.S.; secretaries, Mr. Herbert Goss and Mr. H. Rowland-Brown.—The **President** delivered an address on the subject of "What is a Species?" What is there to fill the vacancy left by the disappearance of the Linnean conception, founded on "special creation"? In many respects it would be advantageous to abandon the word, or to use it solely with its original logical meaning of "kind," or, as zoologists would say, "form." This view was, however, regarded as a "counsel of perfection," impossible of attainment; and the attempt was made to show that the conception of a naturally and freely interbreeding (or syngamic) community lies behind the usual definitions, and that the barrier between species is not sterility, but simply cessation of interbreeding or asyngamy.

PARIS.

Academy of Sciences, January 25.—M. Mascart in the chair.—On certain doubly periodic solutions of some partial differential equations: Émile **Picard.**—On the light emitted spontaneously by certain salts of uranium: Henri **Becquerel.** Some salts of uranium emit light continuously and with an intensity which is greater than would be expected from their radio-activity. The effects are best shown by the double sulphate of uranyl and potassium, and there is a relation between the luminosity and the phosphorescence, since different preparations of this double salt unequally phosphorescent to light are also unequally luminous in the dark. The effects observed are so small that it is necessary for the observer to be in the dark for some time before attempting an experiment. Crystals of the double sulphate exposed to the intense radiation of an electric arc or of a radium salt, and then examined some seconds later in the dark, were no more luminous than specimens of the same salt which had been kept continuously in the dark. The light was too feeble to permit of the examination of the spectrum.—Some new observations on *Piroplasma Donovani*: A. **Laveran** and M. **Mesnil.** This parasite, first found by Dr. Donovan in cases of a fever common near Madras, would also appear to be the cause of a disease known as *Kala-Azar*, or the black fever of the valley of Brahmapootra.—M. Calmette was nominated a correspondant for the section of medicine and surgery in the place of M. Laveran, elected a member in the same section.—The examination of the gases given off or occluded by radium bromide: MM. **Dewar** and **Curie.** A specimen of pure radium bromide was placed in a vacuum in connection with a manometer; gas was found to be evolved at the rate of about 1 c.c. per month, which on spectroscopic examination proved to be hydrogen, most probably produced by the action of the radium compound upon a small quantity of water present. The same specimen, placed in a quartz tube, was heated to redness, any gases given off being removed by the mercury pump. These gases were drawn through tubes cooled down to the temperature of liquid air. The gas which passed through the tube cooled in liquid air was radio-active and strongly luminous, spectroscopic examination of the light emitted showing the three principal bands of nitrogen. The quartz tube containing the radium bromide was then sealed off with the oxyhydrogen blowpipe. Twenty days later M. Deslandres found that the tube gave the complete spectrum of helium, and no other rays could be detected.—On an electrical law of the electrical transportation of dissolved salts: A. **Ponsot.** From the experimental results of M. Chassy, laws are deduced which are in opposition to the hypotheses on which M. Kohlrausch has relied in deducing the molecular conductivity of solutions from the migration numbers.—On certain phenomena arising from physiological sources capable of being transmitted along wires formed of different substances: Augustin **Charpentier.** The physiological radiations, probably identical with the *n*-rays, can be transmitted through a metallic wire as well as through the air. This allows of a much more precise study of these rays from a physiological point of view, one great advantage of the method being that the observer may be placed so far from the sensitive screen as to reduce to a minimum muscular or mental effects foreign to the experiment.—The emission of the Blondlot rays during the action of soluble ferments: M. **Lambert.** The *n*-rays are produced during the action of ferments, the effect being particularly marked for the digestive ferments of albumenoid materials.—On the fluochlorides, the fluobromides and the fluoiodides of the metals

of the alkaline earths: Ed. **Defacqz.** Details are given of the preparation and properties of the barium fluohalogen compounds of the type $BaF_2 : BaCl_2$.—Some colour reactions of molybdic acid: M. Emm. **Pozzi-Escot.** The author has rediscovered the colour reaction between tannin and molybdates which forms the basis of Alexander's method for the determination of lead volumetrically as molybdate.—The electrolysis of chloric acid and chlorates: André **Brochet.** A discussion of the causes of the anomalous results obtained by the electrolysis of chlorates with a copper anode.—On the presence of formaldehyde in atmospheric air: H. **Henriet.** The author has shown in previous papers that there exists in the atmosphere a gaseous substance, which is not formic acid, possessed of energetic reducing properties, capable of reducing Fehling's solution and decolorising iodide of starch solution. By an examination of rain water, proof is now afforded that this reducing substance is formaldehyde, and it appears to be present in proportions between one and five parts per 100,000 of air by weight.—On trichlorisopropyl alcohol: Louis **Henry.** This substance is readily obtained by Grignard's reaction from chloral and methyl magnesium iodide.—On the condensation of acetylenic esters with alcohols: Charles **Moureu.**—On the α-substituted β-methyl-adipic acids: Marcel **Desfontaines.**—On some derivatives of tetramethyldiaminophenyloxanthranol: MM. **Guyot** and **Stœhling.**—On the formation and saccharification of retrograded starch: L. **Maquenne.**—On the distribution of potash in arable earth: J. **Dumont.**—On a new organism (*Pelmatosphaera polycirri*), the parasite of an annelid (*Polycirrus haematodes*): Maurice **Caullery** and Félix **Mesnil.**—On the necessity of instituting an order of Siphomycetes and an order of Microsiphoneæ parallel to the order of Hyphomycetes: Paul **Vuillemin.**—On the vegetation of some submarine soft water springs of the Lower Seine: Maurice **Gomont.**—On the development of the perithecium of Ascobolus: A. **Dangeard.**—On the geological association of iron and phosphorus and the dephosphorisation of iron minerals by natural metallurgy: L. **De Launay.**—On the magnitude of the nummulitic formation of St. Louis, Senegal: Stanislas **Meunier.**—On the ferment of the disease of wine known as *vin pousse*: J. **Laborde.**—The relation between the interstitial gland and the development of sexual characters: P. **Bouin** and P. **Ancel.**—On the correlation of characters susceptible of natural selection: G. **Coutagne.**—The analytical study of the phenomenon of oscillating life: Joseph **Deschamps.**

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 4.

ROYAL SOCIETY, at 4.30.—The Reduction Division in Ferns: R. Gregory.—Cultural Experiments with "Biologic Forms" of the Erysiphaceæ: E. S. Salmon.—On the Origin of Parasitism in Fungi: George Massee.—On Mechanical and Electrical Response in Plants: Prof. J. C. Bose.—On the Effects of Joining the Cervical Sympathetic Nerve with the Chorda Tympani: Prof. J. N. Langley, F.R.S., and Dr. H. K. Anderson.—Conjugation of resting Nuclei in an Epithelioma of the Mouse: Dr. E. F. Bashford and J. A. Murray.

ROYAL INSTITUTION, at 5.—Recent Research in Agriculture: A. D. Hall.

CHEMICAL SOCIETY, at 8.—The Tautomeric Character of the Acidic Thiocyanates—Preliminary Note: R. E. Doran.—The Resolution of $\alpha\beta$-Dihydroxybutyric Acid into its Optically Active Constituents: R. S. Morrell and E. K. Hanson.

LINNEAN SOCIETY, at 8.—Account of Researches in the Physiology of Yeast: Prof. Sydney H. Vines, F.R.S.—Further Researches on the Specialisation of Parasitism in the Erysiphaceæ: E. S. Salmon.

RÖNTGEN SOCIETY, at 8.30.—Discussion on the Production of Photographic Reversal through the Action of Various Radiations.

FRIDAY, FEBRUARY 5.

GEOLOGISTS' ASSOCIATION, at 7.30.—Annual General Meeting. Address by the President, Mr. H. W. Monckton: on some Examples of the Different Types of Geological Formations, with Special Reference to Recent Excursions of the Association (Estuarine, Lagoon, and Marine Deposits).

SATURDAY, FEBRUARY 6.

ROYAL INSTITUTION, at 3.—Study of Style in Greek Sculpture: Dr. C. Waldstein.

MONDAY, FEBRUARY 8.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Turkestan and a Corner of Tibet: Oscar T. Crosby.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Work of the Alloys Research Committee: W. H. Merrett. (Graduates' Lecture.)

SOCIETY OF ARTS, at 8.—Oils and Fats—their Uses and Applications. (Cantor Lectures, III.).

VICTORIA INSTITUTE, at 4.30.—Notes on the Volcanic Phenomena of New Zealand: Miss Hilda Boord.

TUESDAY, FEBRUARY 9.

ROYAL INSTITUTION, at 5.—The Development of Animals: Prof. L. C. Miall, F.R.S.

SOCIETY OF ARTS, at 4.30.—The Biology of Federation: Sir John Cockburn, K.C.M.G.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Tonnage Laws, and the Assessment of Harbour Dues and Charges: H. H. West.

WEDNESDAY, FEBRUARY 10.

SOCIETY OF ARTS, at 8.—Thermit: its Application to Electrical Engineering: C. Vernon Boys, F.R.S.

THURSDAY, FEBRUARY 11.

ROYAL SOCIETY, at 4.30.—*Probable Papers:* A New Method of Detecting Electrical Oscillations: Dr. J. A. Ewing, F.R.S., and L. H. Walter.—Constant Standard Silver Trial-Plates: Edward Matthey.—On Certain Properties of the Alloys of Silver and Cadmium: Dr. T. Kirke Rose.—Sun-spot Variation in Latitude, 1861-1902: Dr. W. J. S. Lockyer.—On the High-Temperature Standards of the National Physical Laboratory. An Account of a Comparison of Platinum Thermometers and Thermo-junctions with the Gas thermometer: Dr. J. A. Harker.

ROYAL INSTITUTION, at 5.—Recent Research in Agriculture: A. D. Hall.

SOCIETY OF ARTS, at 4.30.—Our Commercial Relations with Afghanistan: Col. Sir Thomas H. Holdich, K.C.M.G., K.C.I.E.

MATHEMATICAL SOCIETY, at 5.30.—On the Roots of the Equation $\frac{1}{\Gamma(x+1)} = c$: G. H. Hardy.—On a Certain Double Integral: Prof. A. C. Dixon.—On an Appropriate Form of Conductor for a Moving Point-Singularity: Prof. A. W. Conway.—On Group-Velocity: Prof. H. Lamb.—On Point-Wise Discontinuous Functions of a Real Variable: Dr. E. W. Hobson.—Some Extensions of Abel's Theorem on Power Series on the Circle of Convergence: G. H. Hardy.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Transatlantic Engineering Schools and Engineering: Prof. R. M. Walmsley.

FRIDAY, FEBRUARY 12.

ROYAL INSTITUTION, at 9.—Westminster Abbey in the Early Part of the 17th Century: the Very Rev. J. A. Robinson.

PHYSICAL SOCIETY, at 8.—Annual General Meeting. Address by the president, Dr. R. T. Glazebrook, F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Anniversary Meeting.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Electricity and Destructor Station at Plumstead: T. S. Nash.

MALACOLOGICAL SOCIETY, at 8.—Annual Meeting: President's Address.

SATURDAY, FEBRUARY 13.

ROYAL INSTITUTION, at 3.—Culture and Sculpture: Dr. C. Waldstein.

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